REMARKS

In response to the final Official Action of February 9, 2006, claims 1-12 and 27-29 are canceled, claim 13 is amended and claims 30-34 are added. For the reasons set forth below, it is respectfully submitted that the present application as amended is in condition for allowance.

Referring now to paragraphs 1 and 2 of the Official Action, claims 1-5 and 7-29 are rejected under 35 U.S.C. §102(e) as anticipated in view of US patent application publication 2004/0257090, Barr et al (hereinafter Barr). It is stated that Barr discloses a method for analysing connection conditions between an integrated circuit package (daughter board) and a circuit board (mother board), including the steps recited in claim 1.

In particular, Barr is directed to a printed circuit assembly (PCA) with built-in circuitry to detect and communicate an interconnect failure. The PCA includes a connector, such as connector (102) shown in Figure 1, a continuity detect circuit (104) and an interface circuit (106). The connector is configured to interconnect to an electronic unit and the continuity detect circuit is coupled to the connector for detection of continuity failure in the interconnect. The interface circuit is coupled to the continuity detect circuit for communicating data pertaining to the status of the interconnect to the system management.

In the embodiment shown in Figure 6 of Barr, two or more pins (606A, 606H) of connector (602) are specifically designated for use in verification of proper IC seating (see paragraph 0037). This is typically performed by a first designated pin (606A) of connector (602) to be conductively connected to the continuity detect circuit (104) and a last designated pin (606H) of connector (602) electrically grounded with the possibility of additional pins all conductively connected to the first and last designated pins by a conductive route (608) (Barr, paragraph 0037). As stated in paragraph 0040, if the

packaged IC is not properly seated in the connector (602), then there would be an open circuit such that the voltage on the last pin (606A) would be left floating.

It is therefore clear that Barr introduces an additional element; namely, the connector (102) for providing the analysis of the connection state in conjunction with the continuity detect circuit (104) and interface circuit (106).

More particularly, Barr relates to printed circuit assemblies with built-in circuitry to detect and communicate an interconnect failure. Due to stress, vibration, shock and other reasons, failures within interconnection systems may occur which can be difficult and costly to debug (Barr, paragraphs 0004-0007). In order to provide detecting continuity losses, Barr provides a connector (102) which is configured to interconnect to an electronic unit. In particular, continuity detect circuit (104) is coupled to the connector (102) for detection of continuity failure in the interconnect (Barr, paragraph 0007). The circuit, according to Barr, thus comprises an integrated circuit (100) onto which a connector (102) and a continuity detect circuit (104) are attached (Barr, paragraph 0019). According to Barr, the connector comprises two pins which are specifically designed for use in verification of proper card seating. By configuring the first and second pins towards opposite ends of the card, mis-seating of the card in the connector may be efficiently determined (Barr, paragraph 0021). For connecting an integrated circuit to the circuit board, there is provided a connector (102) onto which the integrated circuit is seated for connection with the printed circuit board (Barr, paragraphs 0024-0025; Figures 1, 2 and 6).

It is noted that in-between an integrated circuit, or an integrated circuit card, and the printed wiring board, a further element; namely, a connector (e.g., connector 102) is positioned (Barr, paragraphs 0036, 0039). In this respect, Barr discloses that in order to connect an integrated circuit package with a circuit board, an intermediate element; namely, a connector is required. The connector therefore needs to be connected to the circuit board and thereafter the integrated circuit is seated onto the connector. The

connector in Barr therefore requires additional space between itself and the integrated circuit connected thereto. This means that the integrated circuit package cannot be directly bonded onto the circuit board, but instead a connector has to be placed in-between the integrated circuit package and the circuit board. This increases the size of an assembly of the integrated package and the circuit board.

Amended claim 13 is believed to distinguish over Barr. In particular, claim 13 is amended to particularly point out and claim a mobile phone comprising a system for analysing connection conditions between an integrated circuit package and a circuit board, with the system comprising coupling elements coupling said integrated circuit package electrically to said circuit board and support elements directly connecting said integrating circuit package mechanically with the circuit board using solder balls. Claim 13 is further amended to set forth that the system comprises conductors configured to electrically connect at least two of said support elements with each other on the side of the integrated circuit package, as well as measuring means arranged at said support element and configured to pick-off physical values between said support elements, as well as evaluation means configured to evaluate said physical values to determine mechanical properties of said support elements and configured to conclude a condition of said electrical coupling of said integrated circuit package with said circuit board from said determined mechanical properties of said support elements. Support for the amendment of claim 13 can be found in the application as filed, including page 7, lines 21-28 and in originally filed claim 15.

Thus, contrary to the disclosure in Barr, no connector is used for connecting the integrated circuit package to the circuit board but rather, the present invention discloses the use of support elements directly connecting said integrated circuit package mechanically with said circuit board using solder balls. It also discloses means for electrically connecting at least two of the support elements with each other on the side of the integrated circuit package, as well as measuring means arranged at said support

elements and configured to pick-off physical values between said support elements, and evaluation means configured to evaluate said physical values in order to determine mechanical properties of said support elements and configured to conclude a condition of said electrical coupling of said integrated circuit package with said circuit board from said determined mechanical properties of said support elements. Use of solder balls provides that the support elements are directly bonded onto the circuit board. The connection between the integrated circuit package and the circuit board therefore requires very little space contrary to the disclosure in Barr. This is particularly advantageous for mobile phones and the like which are typically small-build devices.

Furthermore, the direct coupling between the integrated circuit package and the circuit board using solder balls as support elements prevents the requirement to provide an additional component between the integrated circuit package and the circuit board. That is, it eliminates the need for a connector as required in Barr.

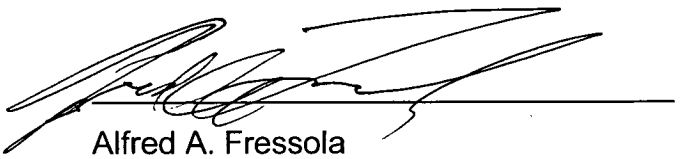
From the above discussion, it is apparent that the present invention provides a mobile phone which comprises a system for analysing connection conditions between an integrated circuit package and a circuit board that can be closely and directly connected to the circuit board using solder balls. This necessarily reduces the overall size of the assembly. As indicated above, this feature of the present invention is particularly useful in mobile devices, such as mobile phones, where space in the housing is limited. Barr does not mention or suggest a system where space limitations are paramount and therefore would not indicate or motivate a person of ordinary skill in the art to replace the connector used in Barr with solder balls so as to reduce the overall size of the overall assembly.

It is therefore respectfully submitted that Barr neither anticipates nor suggests the present invention as set forth in claim 13. Since claim 13 is believed to be distinguished over Barr, it is respectfully submitted that claims 14-26 are also not anticipated or suggested by Barr.

Newly submitted claim 30 is an independent claim directed to a system for analysing connection conditions between an integrated circuit package and a circuit board which is similar in scope to claim 13 and for similar reasons is believed to be not anticipated or suggested by Barr. Dependent claims 31 and 32 are similar in nature to claims 17 and 18 and for similar reasons are believed to be not anticipated or suggested by Barr. Newly submitted claim 33 is an independent claim directed to an apparatus for analysing connection conditions which is similar in nature to claim 13 and, for similar reasons, is believed to be not anticipated or suggested by Barr. Dependent claim 34 is also similar in nature to claim 17 and, for similar reasons, is believed to be not anticipated or suggested by Barr.

In view of the foregoing, it is respectfully submitted that the present application as amended is in condition for allowance and such action is earnestly solicited.

Respectfully submitted,



Dated: May 9, 2006

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